Getting the Job Done

Finding the Time

We understand how important your time is to your business. We're also convinced that energy-efficiency upgrades are well worth your consideration due to the savings and improved comfort they bring.

Getting Started With Few Hassles

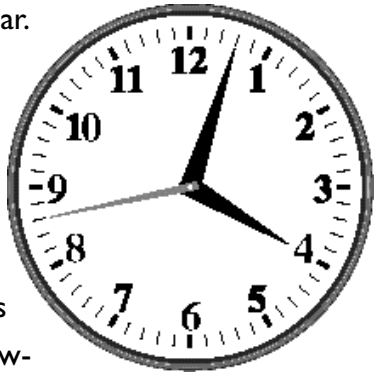
Here are strategies to jump-start your energy savings with a limited investment of your time.

- Ask your utility if they offer free or inexpensive energy audits.
- Invite lighting contractors and heating, ventilating, and air-conditioning (HVAC) contractors to your facility to suggest upgrades and provide free estimates.
- Leverage your time by drawing on the expertise of ENERGY STAR® and Rebuild America Products and Services providers by visiting their Web sites: www.epa.gov/smallbiz/map.ht. www.rebuild.org/business/business.asp.
- Contract with an energy professional to coordinate and manage your project.
- Select turnkey services from an Energy Services Company (ESCO); see page 8.
- Unload responsibilities onto energy professionals when you discover a particular project is taking more of your time than you can afford.

The Cost of Delay

While we often think of upgrade projects in terms of how quickly the investment is paid off through the savings, we don't usually recognize the other side of this equation. For each month or year that you delay your upgrade projects, you completely lose that potential savings forever.

Consider a business with annual energy costs of $25,000. If a comprehensive upgrade program could reduce energy use by 30 percent, this business could save $7,500 per year. Assume that the cost of implementing these measures results in a 3-year simple payback, which is typical. In delaying the upgrade, this business is forfeiting a low-risk investment opportunity at 27 percent interest.



Success Stories

ENERGY STAR publishes "success stories" on actual small business efficiency upgrades online at www.epa.gov/smallbiz. The stories are designed not only to recognize a "job well done" by the small business and its contractors, but to also show other small businesses what equipment, appliances, and strategies are commonly most effective. You will find businesses like yours that have overcome the same obstacles you are facing to achieve bottom line dollar savings, while improving the quality and comfort of their facilities.

There is no substitute for a comprehensive energy survey and analysis of all your firm's energy-efficiency options, but if you "don't do anything else" here are some simple, high "return on investment" equipment upgrades. These 12 "sure savers" include, 1) turn off lights and equipment when not in use; 2) buy ENERGY STAR labeled products; 3) install lighting occupant sensors in proper locations; 4) adjust lighting to actual needs — use free "daylighting"; 5) tune-up HVAC system with annual maintenance contract; 6) regularly change or clean HVAC filters; 7) install a program-mable HVAC thermostat; 8) replace incandescent light bulbs with compact fluorescent lamps (CFLs), wherever appropriate; 9) install LED (light-emitting diode) exit signs; 10) control direct sun through windows; 11) use fans; and 12) plug air leaks with weatherstripping and caulking.

Again, we encourage that your business have a comprehensive, professional energy audit or survey, that will assess all your energy uses, then propose a prioritized (by cost/benefit) list of upgrade investments. Your utility company may offer such services at no cost, or you can find firms that offer such services with the help of ENERGY STAR. To read success stories on real small businesses energy savings, or to find finance, products, and services for your own energy efficiency upgrade, visit http://www.epa.gov/smallbiz/map.html.

Throughout this guide, you will find brief excerpts from ENERGY STAR small business success stories. If your small business has done a great efficiency upgrade, or you are a contractor with a successful client efficiency upgrade, you can submit a success story and even apply for an ENERGY STAR award at www.energystar.gov.

Finding the Funding

The key issue is, how do you pay for the upgrades? Not a problem. Energy-efficiency upgrades make such good business sense that there are many traditional and non-traditional financial resources to use in funding that can provide you with a positive cash flow for your business.

For inexpensive projects, you'll want to fund your upgrades from your own internal funds. This is the best way to keep payback time low and return on investment high. The overhead costs of financing are too high for small projects.

For larger jobs, small businesses often don't have the convenient cash reserves or revolving credit plans that large corporations do. Cash flow limitations can make capital funding from reserves simply impossible. In such situations, financing is the only way the project can be implemented. Fortunately, a wide variety of sources and mechanisms has evolved over the past few years to help small businesses maintain a positive cash flow while implementing energy-efficiency projects.

ENERGY STAR for small business *Web Site*

Resources are available through the ENERGY STAR for small business program to help you find financing. ENERGY STAR does not endorse individual lenders, but we provide a growing list of small business lenders. If you have Internet access, the Web site at www.energystar.gov features the "Finance Directory" (just click on "Find Money"), which provides lender, vender, and utility resources, many with direct Web links. If you do not have Internet access, call us at 1-888 STAR YES, and our "tech support" staff will check your area for financing information.

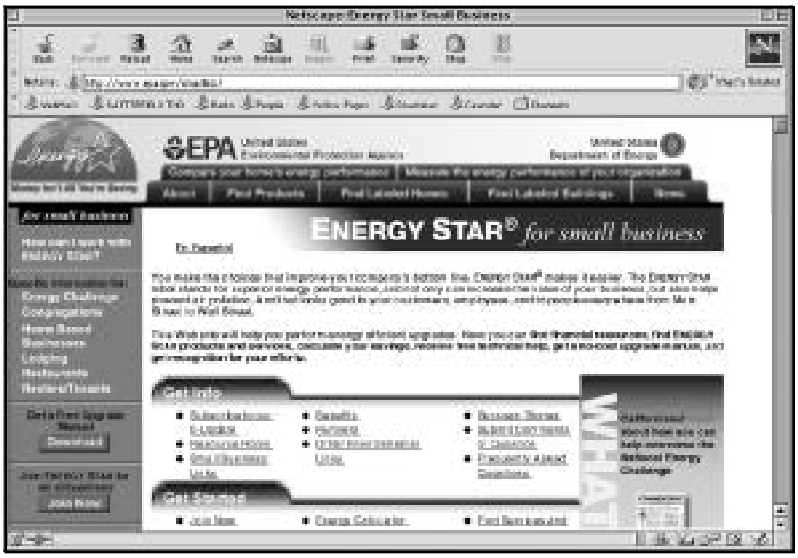
Conventional Loan Sources

Conventional loans are a common financing option for many energy projects. Several different sources for these loans are listed below.

Small Business Administration loans. Your business banker can use the Small Business Administration's (SBA's) 7A loan guaranty programs to back loans for energy-efficiency projects. Here are descriptions of some of the loans SBA offers:

MicroLoans: The MicroLoan program

The ENERGY STAR for small business Web site is a quick avenue to locate financial resources and products and services for you to take advantage of: www.epa.gov/smallbiz.



The ENERGY STAR for small business Finance Directory is available on-line, with direct links to participating lenders. Alternatively, you can call the toll-free hotline at 1-888-STAR YES to request the list for your area; or visit www.epa.gov/smallbiz/map.html.

Legislation in the summer of 1996 extended the ability of businesses to deduct equipment upgrades as an expense.

Savings Implications

If you borrow money to pay for energy-saving measures, keep two considerations in mind. First, you may want to arrange the loan period to be long enough so that you realize a positive cash flow each month. That is, if you implement a $4,000 measure that saves $1,200 per year ($100 per month), then you could arrange a loan that pays back the $4,000 at a rate of less than $100 per month. This way your business will always see a positive cash flow for the measure. This cash flow will be smaller while you're paying off the loan but will increase dramatically once the loan is paid off.

Second, financing your upgrades with a loan will slightly extend your payback period and reduce your internal rate of return. Be sure to incorporate this factor into your business analysis.

provides small loans ranging from $100 to $25,000. Completed applications are usually processed within a week.

SBAExpress Loans: This program provides a guaranty on small business loans of up to $150,000 within 36 hours of receiving the completed loan application package.

CAPLines Loans: Under this program, small businesses unable to meet traditional credit standards can get a revolving line of credit up to $750,000.

To find out more, call SBA at 1-800-8-ASK SBA or see their Web site at www.sba.gov for more information.

Supplier Loans. Many suppliers offer financing in combination with installation of their equipment. You'll want to make sure the interest rate is comparable to what you can get elsewhere. See "Products and Services" at www.energystar.gov.

Utility Loans. Your local utility may have a low-interest loan program or rebates to underwrite energy-efficiency projects.

Finally, your state energy office may be aware of alternative sources of grant monies and loans.

Performance Contracting

Financing your project yourself through a cash purchase or a loan requires you to shoulder all the responsibility for the project's success. Performance contracting, available primarily through Energy Services Companies (see page 8), is an alternative way to finance energy-efficiency projects. You receive a lower level of cost savings at first but have assurance that your actual savings will meet your expectations. Performance contracts are typically negotiated with no up-front cost to the building owner, and all project expenses are paid for by the energy savings. A detailed explanation of performance contracts is found in *Financing Your Energy-Efficiency Upgrade*, EPA 430-B-97-003. Call the ENERGY STAR hotline at 1-888-STAR YES for this or other publications.

Reinvestment of Savings

The ENERGY STAR program emphasizes a staged approach to energy investment projects (see page 32). Part of the reason for this is technical, but another part is that you can use the cost savings from your first project to fund your second project, your third project, and so on.

Tax Implications

Legislation in the summer of 1996 extended the ability of businesses to deduct equipment upgrades as an expense. This can save you money by taking capital costs that normally would be amortized and deducted from declared profit over several years and advancing the costs into a current year tax deduction. We suggest that you contact your accountant for more information on how upgrade projects can reduce your taxes and improve your cash flow.

Learning About Energy Efficiency

If you're like most small business operators, you know a lot more about running your business than about the intricacies of motors, lighting, or air conditioning. We understand you may be reluctant to take on the challenges of building upgrade projects, especially when your existing equipment still works. We will help you successfully implement up-grades by relying heavily on energy professionals and ENERGY STAR resources. ENERGY STAR will help you through the process, and we can answer your most difficult questions.

Energy-Efficiency Basics

Building technologies have been advancing at a striking pace over the past decade. It is now possible to perform upgrades that reduce energy use by up to 50 percent in some cases. If your building's lighting and heating/cooling systems are more than 10 years old, you could potentially see big savings by upgrading them. Some of the key opportunities are described below.

Lighting. Even though the light bulb is still the symbol of innovation, old incandescent bulbs consume 75 percent more electricity than compact fluorescent bulbs. There are also new technologies to reduce the energy use of fluorescent fixtures. And occupancy sensors, which turn lights off in unoccupied areas, have become surprisingly inexpensive (see page 45). Look around your building. If you use just about any fixtures that are more than 10 years old, your building is a good candidate for a lighting upgrade.

Building Tune-Up. Get your building back to its peak performance. See page 49 for more information.

Office Equipment and Paper Use. Selecting ENERGY STAR equipment when you purchase new computers or office equipment and encouraging a few simple practices among your employees will yield energy savings with absolutely no investment cost. See pages 51–53 for more information.

Consider Some of the Traditional Myths About Equipment and Energy Use

Myth: *Leaving computers on helps them last longer.*

Reality: Today's computers do not suffer from being turned on and off thousands of times. In fact, turning computers off when they're not being used lowers the amount of dust buildup inside, which helps them last longer while saving you money.

Myth: *Energy costs are an insignificant part of total expenses.*

Reality: Typical restauranteurs and grocers spend as much on energy as they earn in total profits. Furthermore, improved employee comfort and productivity (which are common after building upgrades) can lead to much greater profit than is indicated by your reduced utility bills.[1]

Myth: *Fluorescent lights last longer if not turned on and off.*

Reality: Switching fluorescent lights on and off does slightly shorten their life. However, any time the lights will not be needed for more than about 10 minutes, you save more money by turning them off than by leaving them on.

Myth: *I should replace old equipment with more efficient versions only as the old systems break.*

Reality: With some new technologies, such as T-8 fluorescent lights (20 to 60 percent savings) or light-emitting diode (LED) exit signs (up to 90 percent savings), there's just no reason to wait. You can start saving money on energy and maintenance costs right away.

[1] *American Society of Heating, Refrigeration and Air-Conditioning Engineers Journal,* January, 1997.

Unique opportunities for energy savings are available for each business.

Water Heating and Water Conservation. You may be paying more than you have to for water use or water heating. Learn more starting on page 57.

Refrigeration. Check your seals regularly and specify high-efficiency evaporator fans when you buy new systems. These and other operations and maintenance guidelines will keep your refrigeration equipment working at peak efficiency. See page 63 for additional ideas.

Building Construction. Starting on page 65 is a review of the steps to upgrade your building's walls, roof, and windows to get the most comfort from your heating and cooling units.

Heating and Cooling. Inexpensive modifications such as installing programmable thermostats and cleaning your filters can often significantly reduce your heating or cooling costs. Thinking of replacing your old system? See page 71 to explore the options before you buy, because it may be worth a little extra to buy a high-efficiency unit. If your existing system is old enough, it may be cost effective to replace it with a new one immediately.

Other Opportunities. Each business has unique opportunities for energy savings based on the particular equipment it uses or the processes that occur. Many of these measures are discussed starting on page 79. You can also call the ENERGY STAR hotline at 1-888-STAR YES for information on measures not covered in this guide.

Installation Support

Lean on outside contractors for expertise and installation. Available resources include ESCOs and conventional contractors:

- **Energy Services Companies (ESCOs)** offer turnkey services that are excellent alternatives for larger projects. The company will perform an audit (usually free) to identify savings opportunities and will arrange financing, coordinate contractors, and perform all project management. Often these projects are financed as performance contracts, where the ESCO receives a portion of the savings generated by the project. The National Association of Energy Services Companies (NAESCO) can refer you to the ESCOs in your area; call (202) 822-0950 or visit the Web site at www.naesco.org.
- **Lighting contractors** will be familiar with all aspects of lighting design and can conduct lighting audits, recommend replacements, and calculate energy and cost savings. Lighting contractors are the best choice when the project is high profile or requires significant lighting redesign.
- **Electrical contractors** have skills installing motors, modifying equipment, and performing straightforward lighting upgrades.
- **Mechanical contractors** specialize in the heating, cooling, and ventilating systems at a facility. They can coordinate the work of subcontractors and interface with installers of Energy Management Systems (EMSs) if required.
- **Controls contractors** specialize in the automatic controls for heating, cooling, ventilating, lighting, and emergency systems. Installation of a central computerized control system with advanced energy savings functions (also known as EMS) is cost effective for many facilities.
- **Operations and maintenance contractors** will perform routine preventive maintenance and improve equipment operating schedules that can extend equipment life and reduce energy use.

Look to Experts for Advice

The type of help you will need to start your upgrade projects depends on the amount and skill level of in-house support, the type of project, project size, and how the project will be financed. To begin, you may need the help of a consultant or an energy auditor to identify upgrade opportunities. If your in-house support is extremely limited, you may need some level of management or oversight by a consultant other than the contractor performing the work. Typically this is money well spent, because just like hiring a professional accountant to prepare your tax returns, professional consultants or auditors often save you more money and provide fast and efficient results that allow you to make knowledgeable choices concerning energy-efficiency upgrades.

Start with a free energy audit where available. First call your electric or gas utility. Almost half of the country's biggest utility companies offer free or subsidized energy audits for commercial customers to identify energy-

efficiency opportunities. These audits may not identify too many fuel-switching opportunities that convert you from the sponsoring utility's product, but they are an excellent and objective way to get started. Some utilities give out compact fluorescent lamps for free to their customers. If you don't have any luck there, you can sometimes call your electrical or heating, ventilating, and air-conditioning (HVAC) contractors for free walk-through audits. Just recognize that the contractor's agenda for such an audit will include a sales pitch; if you don't have a long-term relationship with your contractor, you will want to carefully consider capital-intensive recommendations. If you don't have a contractor, call 1-888-STAR YES and ask for your nearest ENERGY STAR buildings partner. ENERGY STAR buildings partners have received training in strategies to upgrade building systems to optimize performance.

For large projects outside your realm of expertise, consider hiring consultants to prepare bid documents or to verify the work of contractors. For more information see page 15. As a rule of thumb, it is worthwhile to have a management investment of 3 percent to 10 percent of the project cost so an independent expert can oversee major projects. This premium doesn't detract much from your payback and is a good insurance policy. Look in the yellow pages of your phone book under "engineering consultants," or similar titles, or call 1-888-STAR YES for the name of your nearest ENERGY STAR buildings partner.

For information on financial or technical assistance contact your local small business development center or visit http://www.asbdc-us.org/ for a list, or call the Small Business Administration at 1-800-8-ASK SBA. You can also contact your state energy office or ask your local Chamber of Commerce.

Where Can I Learn More?

For more information on energy technologies and audit capabilities, contact:

- Air Conditioning Contractors of America (ACCA): (301) 384-2222
- American Consulting Engineers Council (ACEC): (202) 347-7474
- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE): 1-800-527-4723 or (404) 636-8400; www.ashrae.org
- American Society of Mechanical Engineers (ASME): 1-800-THE-ASME or (301) 937-2799; www.asme.org
- American Solar Energy Society (ASES): (303) 443-3130; www.ases.org
- Association of Energy Engineers (AEE): (770) 447-5083, ext. 220; www.aeecenter.org
- The Association of Energy Service Professionals (AESP): (407) 361-0023
- Association of Small Business Development Centers (ASBDC): (703) 764-9850; info@asbdc-us.org
- Center for Renewable Energy and Sustainable Technologies (CREST): 1-888-44CREST; www.solstice.crest.org/
- Electric Power Research Institute (EPRI): www.epri.com
- The Energy-Efficiency and Renewable Energy Clearinghouse (EREC): 1-800-313-3774 or (650) 855-2000; www.eren.doe.gov
- ENERGY STAR for Small Business Hotline: 1-888-STAR YES; www.energystar.gov
- Energy User News: (248) 362-3700; www.energyusernews.com
- Lighting Research Center: (518) 687-7100; www.lrc.rpi.edu
- National Association of Energy Services Companies (NAESCO): (202) 822-0950; www.naesco.org
- National Trust Main Street Center: (202) 588-6219; www.mainst.org
- National Society of Professional Engineers (NSPE): (703) 684-2800; www.nspe.org
- Rebuild America: 1-800-DOE-3732; www.rebuild.org

Look in the yellow pages of your phone book under engineering consultants, or similar titles, or call 1-888-STAR YES. Online, visit the map-based directory of finance, products, and services at www.epa.gov/smallbiz/map.html or visit the Rebuild America Business Partners page at www.rebuild.org/business/business.asp.

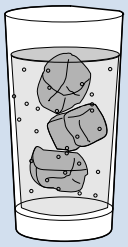
Success Stories

Subway Franchises Make Bread of Another Kind

Twenty thousand dollars can buy a lot of bread. That's what Subway franchise owner Steve Kaplan is saving by installing energy-efficient equipment, including lighting, in seven Subway locations in Oklahoma. With these improvements he reduced his energy costs by 40 percent and made his restaurants more attractive and comfortable for customers. In addition to properly lighting his restaurants, Kaplan makes his energy-efficient equipment upgrades where he will get a 3-year payback or better. Because Kaplan leases the space for all seven of his Subway franchises, he upgrades only when he plans to renew a lease that is at least three to five years in length.

Just the Right Light to Whet Your Appetite

Kaplan changed his stores' lighting from 40-watt T-12 lamps with magnetic ballasts to 32-watt T-8 lamps with electronic ballasts and reflectors. "After I installed the energy-efficient lighting," he said, "my customers said the produce looked fresher and more appealing" thanks to the better color-rendering of the T-8 lamps he installed. Subway franchises are required to have a high light level, and Kaplan's lighting upgrades maintain this very bright level even though each fixture was reduced from four bulbs to two.

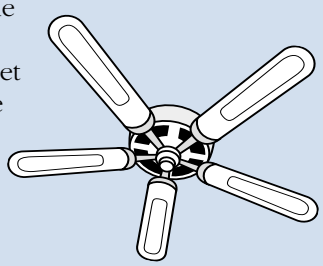


Cool as a Cucumber Sandwich

The store's kitchen equipment generates so much heat that the air conditioning runs year-round. Ice makers are one of the main heat sources. To reduce his air-conditioning costs, Kaplan has invested in water-cooled condensers for ice makers in some of his stores so the heat from the ice makers goes into the water instead of the room. His choice of stores depends on whether his water or electricity utility costs are higher in the area. For the future he's looking into buying ice makers that have separate condensers so the heat from the ice makers can be sent straight outside.

Customer Comfort Comes First

Kaplan wants his stores to be inviting year-round with plenty of air-conditioning capacity, so whenever he opens a new store he replaces the old air conditioner with a high-efficiency unit. The units run year-round so paying a premium for high-efficiency units is well worth it for him. To keep his costs down, he also installs ceiling fans. They add to the ambiance, and the slight breeze they provide allows him to set his air conditioner three to five degrees higher without any sacrifice in comfort. This saves him money too.



Upgrades are Piled High With All the Trimmings

Kaplan has switched from electric to gas water heaters with just a 1-year payback on the installation thanks to the low cost of gas, even including the cost to build a special fire-retardant closet and install a roof vent. His windows are all tinted to keep out heat from the sun. Maintenance is an inexpensive way to save money, and Kaplan takes advantage by regularly inspecting his refrigerator and freezer door gaskets.

Rolling in the Dough

Overall, Kaplan saves $20,000 per year from his upgrades. The upgrades also make his food look more appealing and keep his customers more comfortable. Participation in the ENERGY STAR program helped Kaplan make the right decisions and gave him free publicity. That's smart business.

Making a Good Building Even Better

ENERGY STAR partners have reduced their buildings' energy costs by an average of about 30 percent, and upgrades at these sites continue. But even if your building is already relatively energy efficient, almost every commercial building can have its energy costs reduced by at least 10 percent with measures that pay for themselves in less than three years. Energy cost reduction of 50 percent or more will be economically profitable at some sites.

The best way to measure your energy use is by calculating it per square foot and comparing it with other buildings that conduct the same type of business that you do. Fill out the worksheet on page 12.

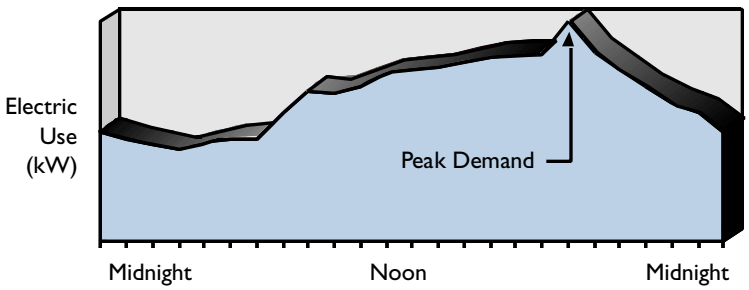
Once you have calculated your electric energy intensity, look at the pie charts on pages 13 and 14. The charts show the national average of typical annual energy use by building type for all-electric buildings. The pie pieces are sized according to total energy use and are labeled according to equipment type. Certainly an office in Miami, FL, will use more energy than the same type of office in downtown San Francisco, CA, so be sure to consider heating and cooling variations in your comparison.

Keep in mind that the values on pages 13 and 14 are averages. An "average" business will typically have profitable opportunities to lower its bills by 30 percent. A business using more than the average amount of electricity may have even better opportunities. Even a business significantly below the average can usually find potential savings through measures that emphasize the newest technologies (such as ENERGY STAR office equipment).

To find the best upgrades for your building and equipment, you will want to identify the area of your highest energy use. The best place to start is to review your electric, natural gas, fuel oil, and other energy bills for the past year. Select your highest bill. Is it highest in the summer? This probably indicates high air-conditioning costs. Is it highest in the winter? If you currently have electric resistance heat, you may save money by converting to natural gas, fuel oil, or an electric heat pump. Are your electric bills higher in spring and fall than in summer and winter? Simple modifications to your heating and cooling systems may provide excellent savings.

Many times you will discover that your peak electricity use occurs during a time of year when rates are highest. In addition, your electric bills may have a demand charge component, which is a charge based on your peak rate of electricity use. These factors make it especially important to select energy-efficiency upgrades that will lower your energy use when the utility's rates are at their highest or when your facility's demand is at its peak.

ENERGY STAR partners have reduced their buildings' energy costs by an average of about 30 percent.



If you are charged a "demand charge" on your electric bill, you pay a fee based on your peak rate of electricity consumption. Lowering your peak rate of usage can save big.

How Efficient Are You?

Use this worksheet to compute your electric energy intensity, or visit www.epa.gov/smallbiz/calculate.html.

1. Look through a few of your electric bills, including winter, spring, fall, and summer months if possible. Write the average kilowatt-hour (kWh) per month on line (A). — (A) _____ kWh/month

2. Multiply (A) by 12 to compute your approximate annual electricity use. Write this number on line (B). — (B) _____ kWh/year

3. On line (C), write down the size of your facility in square feet. — (C) _____ square feet

4. Calculate your **electric energy intensity** by dividing (B) by (C) to get the overall kWh per square foot per year. Write this number on line (D). — (D) _____ kWh/sq.ft./year

5. Compare the number on line (D) with the results of similar businesses around the country (your competitors) so you can find out where you stand in relation to your peers. See the pie charts on the next two pages.

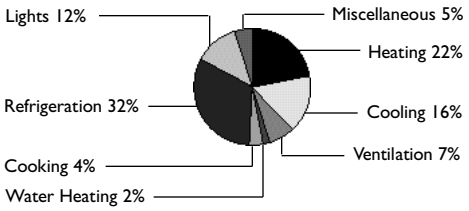
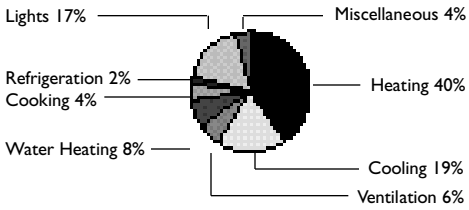
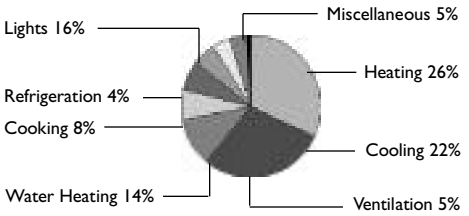
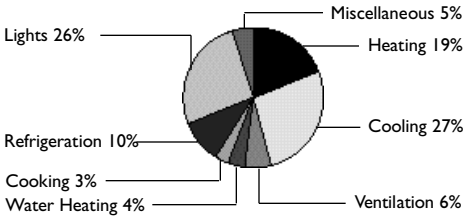
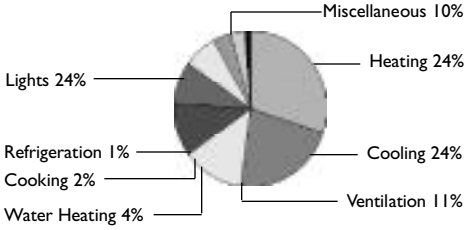
The **electric energy intensity** you just calculated does not include the fuel oil, natural gas, purchased steam, or propane your business may use. If you would like to compare your *total* energy use and costs with similar businesses in your climate region, see *Average Energy Use and Costs Throughout the United States* on page 95.

Using Utility Bills To Forecast Upgrade Costs

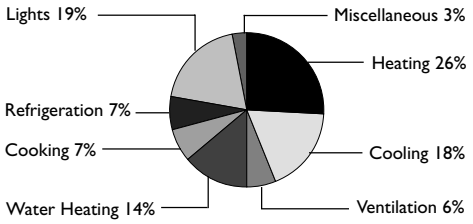
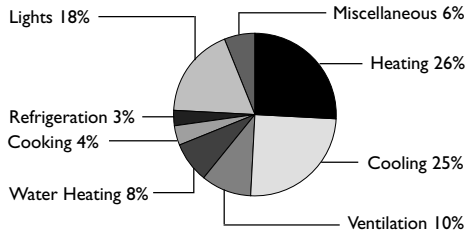
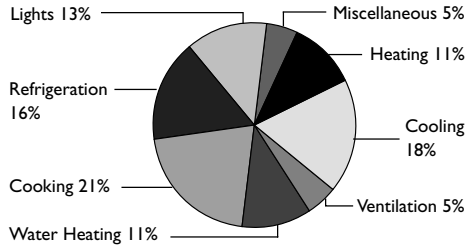
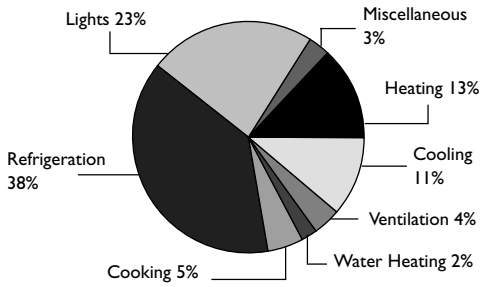
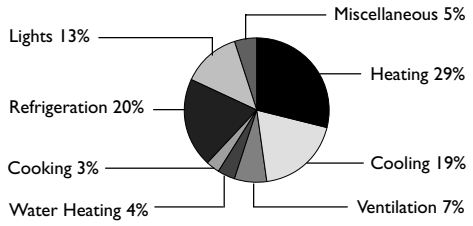
You can use your current utility bills to estimate the total cost of upgrades that may be cost effective. ENERGY STAR's experience with energy-efficiency upgrades has shown upgrade savings to be between 10 and 50 percent of existing utility bills. Because the typical upgrade costs three times what it saves in one year, you can anticipate an upgrade budget of roughly 100 to 150 percent of your total annual utility bills.

For example, if your annual utility bill is $24,000 (for all fuels), it may be cost effective to anticipate spending $24,000 to $36,000 on upgrading your equipment. You can find information on financing these upgrades starting on page 27. This budget can be a good reality check once you start getting prices from suppliers and contractors. Of course, you may encounter savings higher or lower than this depending on your facility.

Compare Your Business With the National Averages

Your Business Type	Your Electric Energy Intensity (kWh/sq.ft./year)	National Average Electric Energy Intensity (kWh/sq.ft./year)	Typical Electric Energy Use
Warehouse	_____ Line (D) from worksheet on page 12	**6.5**	
School	_____ Line (D) from worksheet on page 12	**9.0**	
Lodging	_____ Line (D) from worksheet on page 12	**15.3**	
Retail	_____ Line (D) from worksheet on page 12	**15.3**	
Office	_____ Line (D) from worksheet on page 12	**16.5**	

Compare Your Business With the National Averages (continued)

Your Business Type	Your Electric Energy Intensity (kWh/sq.ft./year)	National Average Electric Energy Intensity (kWh/sq.ft./year)	Typical Electric Energy Use
College	_____ Line (D) from worksheet on page 12	**18.6**	
Health	_____ Line (D) from worksheet on page 12	**22.3**	
Restaurant	_____ Line (D) from worksheet on page 12	**43.4**	
Grocery	_____ Line (D) from worksheet on page 12	**52.5**	
Miscellaneous	_____ Line (D) from worksheet on page 12	**12.3**	

Note: Pie charts reflect proportions for typical all-electric buildings.
Data aggregated from the Electric Power Research Institute's *COMMEND User's Manual*, U.S. Department of Energy's *Commercial Building Energy Consumption Survey*, and Aspen Systems Corporation research data.

Selecting a Contractor

Your selection of contractors and other energy professionals will have a strong bearing on the success of your upgrade program. Some contractors may recommend upgrades that are less than optimum due to either a hidden sales agenda or limited experience with other technologies.

Resources Through ENERGY STAR, Rebuild America, and The National Main Street Center

Selecting contractors and other professionals who are affiliated with each of these national programs will help ensure that your job will be performed in accordance with the latest energy-efficiency technologies. Here is how you can contact specific organizations through each program:

ENERGY STAR: Visit the online directory of finance, products and services for your state at www.epa.gov/smallbiz/map.html.

Rebuild America: Visit the Rebuild America Business Partners Web site at www.rebuild.org/business/business.asp to search for experts in areas such as financing.

The National Main Street Center: Through the Main Street Network, you can tap into a comprehensive range of expertise, from commercial district revitalization to economic development to building, landscape, and district design. To find out more, visit www.mainst.org/technical/technicalmain.htm.

All of these programs also sponsor regional workshops for businesses that provide the opportunity to learn how to get upgrades done or to network and exchange information on what has worked at their facilities.

Solicit Competitive Bids

For larger projects, an ENERGY STAR small business should issue a request for proposal (RFP) to get competitive bids that are all based on the same scope of work. Although this may seem like a costly process up front, it could save you a lot of money on design and construction costs in the long run. For smaller projects, it may not be cost effective to go through the RFP procedure; therefore, you'll need to rely more heavily on the interview and reference portions of this exercise (see page 17). The break-even point for issuing an RFP depends on project size, complexity, and whether in-house personnel are sufficiently skilled to prepare the RFP document. At the very least, you should get multiple bids on any large job.

The RFP structure depends on how much background work has already been completed on the project. If no preliminary work has been done on project development or design, a small business will need a more complete menu of services than might otherwise be the case. The RFP invites interested parties to visit the site and conduct

Any small business, anywhere can benefit from the California Energy Commission's "Handbooks for Energy Effiicency" series. Titles include "Energy Accounting," "How to Hire an Energy Services Company," and "How to Hire a Constructuion Manager For Your Energy Efficiecy Projects." Visit http://www.energy.ca.gov/reports/efficiency_handbooks/index.html for more information.

A critical step in the success of a building upgrade project is the evaluation of proposals.

initial audits of the facilities to identify potential projects. Based on these initial audits, the contractors may submit details of projects that they have identified, including estimates of energy savings and cost savings, and a description of other benefits.

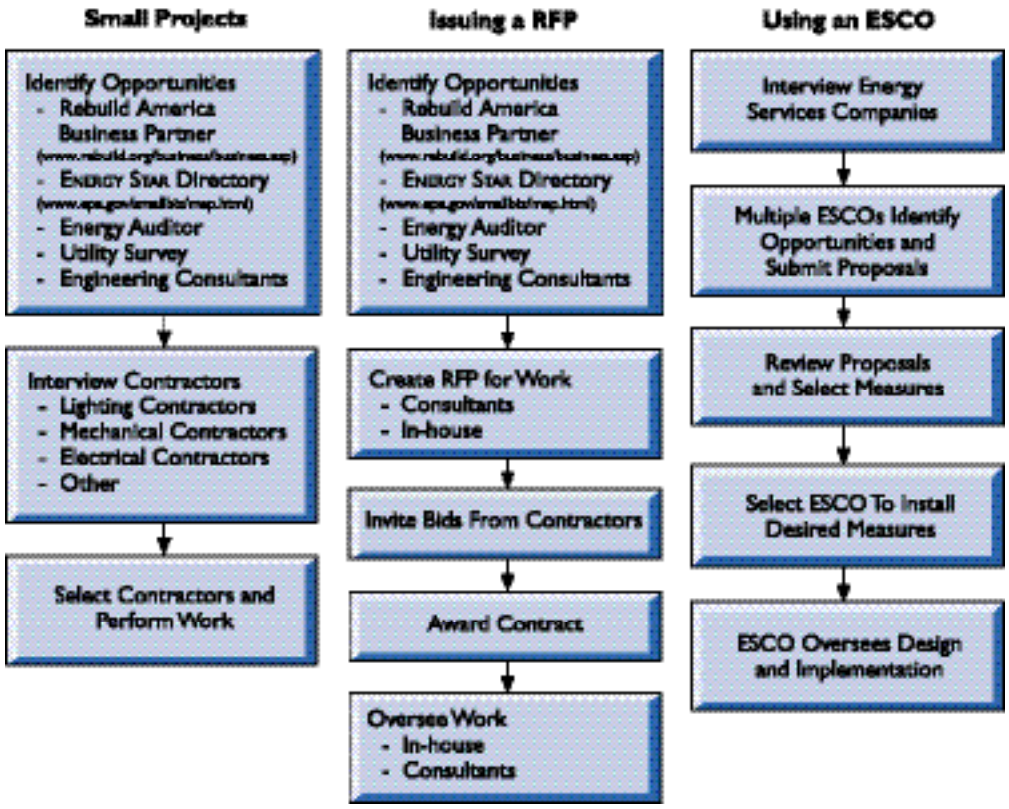
If a facility's energy audit identifies energy savings opportunities, the potential bidders can be provided with a copy of the completed audit. These contractors can then base their proposals on the information provided, or propose modified or alternative solutions that are more cost effective.

If a design has been completed on a specific energy measure, a small business can provide potential bidders with a set of the design drawings from which they can develop their installation cost proposal.

Evaluation of proposals is a critical step in the success of a building upgrade project. To compare proposals, especially those that contain different energy-saving strategies or specified equipment, a basic knowledge of the technologies is required. If this expertise is not available within a small business, an outside source such as an ENERGY STAR buildings partner or an

Moving Your Projects Along

Projects will require a different mix of professionals depending on the job size, your in-house capabilities, and whether you choose to contract with an Energy Services Company (ESCO).



engineering consultant should be part of the selection process.

The following guidelines will assist you in selecting the best contractors for your job, regardless of whether or not you issue an RFP.

Interview Prospective Contractors

Contractors will be eager to discuss their capabilities and experience with you. Ask if they have worked on projects similar to yours. Discuss the type of work relationship that they like to establish. Get information on the complete scope of services available, including project management, consulting, verifying the work of others, operations and maintenance, arranging financing, filing utility rebate documentation, and so forth. Request information on the number of and experience of the engineers that would be assigned to your project, and check to see if they are affiliated with the relevant professional societies. Ask contractors if they received any awards or had their work featured in magazines or journals.

Check References

Obtain the phone numbers of three businesses where the contractors have performed work similar to your project. Call these businesses and ask if they are pleased with the contractor's work and how the contractor responded to any problems that occurred over the course of the project.

Manage Contractors

Detailed coordination while the project is under way will minimize the inconvenience to your staff, while allowing the contractor to perform a profitable, high-quality installation. Regular meetings with you, your contractor, and other relevant personnel are essential. Well-defined project stages, combined with interim payments, will serve as a mechanism of dialogue during the project. For example, 10 percent of the project cost can be due upon presentation and acceptance of the design drawings, 70 percent can be due as the work progresses, and the final 20 percent can be due after performance verification and staff training.

Settle Difficulties

Don't pay your final bill until you're satisfied with the work, and remember that as a consumer you have every right to satisfactory service. For big air-conditioning jobs, a revisit to tune up the system is not unusual. Reputable contractors often will make the extra effort to ensure that you're a satisfied customer.

In the unlikely event that serious problems do arise, consider binding arbitration. Binding arbitration has become common among the building trades because it offers fast resolution with little of the expense or unresponsiveness of the legal system. We recommend that you consider specifically citing the use of binding arbitration in your contracts.

Detailed coordination during the project minimizes the inconvenience to your staff and allows the contractor to perform a profitable, high-quality installation.

Profiting From Energy Savings as a Tenant

Whether the cost of utilities is billed directly to you by the utility companies or is included in the rent, all tenants ultimately pay to keep the building comfortable and well lit. Tenants are often disinclined to invest in the building itself, however, because they don't own the premises. This section describes strategies for reducing energy and rent costs for the 70 percent of small businesses that don't own their own space.

You Pay Your Utilities Directly

If you pay your own utility bills directly, any upgrade will be worthwhile if it meets your investment criteria and pays for itself before you expect to move. Because upgrades typically increase the value of the leased space, you may be able to get your landlord to subsidize the upgrade cost or decrease your monthly rent. The latter possibility makes a good energy-efficiency investment even better, and you may wind up with a better deal than if you owned your space.

In some leasing arrangements where the tenant pays the utility bills, the landlord marks up the cost of utilities with a handling fee of about 10 percent. If so, your incentive to reduce energy costs are higher than if you own the building because you can save even more.

Utility Costs Are Included in Your Lease

If you don't pay your own utility bills directly, ask your landlord if you can get a $100 monthly rent reduction if you install new lights that use $90 per

Success Stories

A Home Office in Bethesda, MD

A consulting engineer in Bethesda, MD, used a rented house as her office. When she first moved in, the house was cold and drafty and had exorbitant utility bills. To improve working conditions and save energy, she negotiated an arrangement with her landlord. The consultant and her husband purchased and installed attic insulation, new double-pane windows, top-quality indoor shades, new doors, and a programmable thermostat. The landlord reimbursed them for materials and also paid for their labor at 50 percent of the market rate. The improvements saved the consultant about $50 per month during the summer and winter months and greatly increased comfort. Furthermore, the landlord reduced the consultant's rent by 20 percent, or $200 per month, for one year after the renovations to compensate her for her efforts. The landlord benefited as well. He had a stable lease, and once the consultant did move out, he sold the house in only three weeks and made a profit of $75,000. An estimated $10,000 of that profit was due to the recent renovations.

	Costs	Benefits
The Tenant	Time to install upgrades	More comfort $400/year lower gas and electric bills $2,400/year lower rent
The Landlord	$3,115 materials $840 labor $2,400 rent reduction	$3,115 tax deduction $840 free labor $10,000 capital appreciation

Visit "Energy Efficiency and Tenants" at www.epa.gov/smallbiz/tenant.html, or ask for "small business tech support" at 1-888-STAR YES.

month less energy and increase the property's market value. Your landlord just might say yes. Alternatively, your landlord might pay for the total cost of upgrade projects if she or he believes that the upgrades will extend the time that you remain in the space. Remind the landlord that capital improvements are often tax deductible.

Focus on No-Cost or Low-Cost Opportunities

Even given the rationale above, typical tenants will not be interested in investing $20,000 in new windows for a building owned by someone else unless the investment is part of a larger marketing "image makeover." Tenants are often best served by focusing on measures that require little capital and will help increase comfort. These measures can save tenants a surprising amount of money and are ideal for businesses that rent their facilities.

No-Cost Options

- Turn up or turn back thermostats during unoccupied times (consider installing a programmable thermostat; see page 72)
- Turn off lights and office equipment at night and over the weekend
- Take advantage of daylight
- Use e-mail instead of paper memos
- Disconnect unnecessary equipment such as unused freezers, water heaters, and transformers

Low-Cost Options

- Caulk and weather-strip windows and doors
- Replace light bulbs with more efficient ones
- Install occupancy sensors in areas such as conference rooms and storage rooms
- Install timers on electric water heaters or other equipment
- Install awnings or shades to keep out the summer sun and lower air-conditioning costs
- Fix leaking faucets, showerheads, pipes, or toilets

Focus on Savings You Can Take With You

ENERGY STAR office equipment represents a lasting investment in your business. If you buy an ENERGY STAR computer, fax machine, copier, or printer, the equipment stays with you even if you move so that your savings don't depend on the length of your lease.

Marketing Adds Profits

Measures that may enhance your business, such as improving the lighting in key merchandise areas, are excellent opportunities. Promoting your business through the ENERGY STAR, Rebuild America, or Main Street programs may increase your visibility, and in turn, your sales.

Each of these programs proudly supports the small businesses of the country and can provide recognition to you. Each program offers many resources, such as display posters, articles, and publicity and events that focus on good community stewardship. The ENERGY STAR for small business Web site even has hypertext links so that visitors from all over the world can jump straight to your home page! Together, these efforts can give your business a large and positive presence in your community.

Refer Your Landlord to Us

Landlords also can benefit from participation in the ENERGY STAR for small business program or the ENERGY STAR buildings program. Have your landlord call the ENERGY STAR toll-free hotline at 1-888-STAR YES to discuss materials and programs specifically designed for property managers.

Verifying Savings

You can't see energy, so it can be hard to tell if an upgrade is a success. As a small business owner, you want to make sure that the money you invest in implementing energy-efficiency measures provides the anticipated savings on your utility bills. This section describes the features of successful programs and highlights principles you can apply to quantify savings.

Compare Before and After Utility Bills

Bill comparison provides you with a technique to quantify your savings after implementation of energy-efficient measures. Because so many different factors affect bills, this approach is most revealing when you have implemented major projects that should save you more than 10 percent. Simply add up your energy bills for the year prior to implementation of the measures and for the year after project completion. Subtract the 12 months of "after" from the 12 months of "before" and you will have your gross cost savings.

You will need to adjust the gross savings depending on differences in behavior and changes in energy prices and weather during the two years. For example, if your business expanded 20 percent over the course of the two years, then it is likely that your energy use increased as well. Take this into consideration. Many utility bills will include a statement about the number of "heating degree days" that occurred during the billing period. Bill analysis should take into account yearly variations in weather. For example, during a very mild winter, your heating system might not be running at full capacity; therefore, energy savings associated with the heating system might not be obvious.

Spot Metering

Spot metering is particularly applicable for lighting upgrades. Ask your lighting contractor to turn on all the old lights that are to be replaced and then measure the current leaving the circuit breaker and leading to the fixtures for at least one circuit. After the upgrade is complete, measure the current for that same circuit. Then perform the following calculations:

1. Subtract the lower post-upgrade current from the higher pre-upgrade current.

Bill comparison lets you quantify your savings after you implement energy-efficient measures.

The Keys to a Successful Program

Your chances of truly lowering your costs will increase if you:

- Focus your upgrade projects on the areas of highest energy use for the facility.
- Focus on proven energy-efficiency technologies.
- Meter before and after the job is complete.
- "Commission" the project; that is, inspect and verify proper installation and operation.
- Use Rebuild America Business Partners (www.rebuild.org/business/business.html) or the ENERGY STAR Directory (www.epa.gov/smallbiz/map.html).
- Use internal or hired staff that have a track record of success.
- Hire a top-quality contractor.

To ensure the soundness of the project, measure the financial performance of your investment in energy-efficiency technologies.

2. Multiply the change in current by the voltage to get watts saved on the circuit.

3. Divide watts saved by the number of upgraded fixtures to get watts saved per fixture.

4. Compare the watts saved per fixture to your expectations and the supplier's quote.

Insist that the current measurement be done in your presence. This exercise will take less than 10 minutes and will give you a lot more confidence in the success of the project.

Extended Metering

Although installing additional meters to directly measure energy consumption is usually beyond the scope of energy-efficiency projects, innovative strategies may provide some of this information. For example, timers are installed on some equipment to facilitate scheduled maintenance. These timers can be recorded to verify the performance of energy savings measures that result in reduced equipment operation hours.

Some programmable thermostats are equipped with simple functions that estimate the hours of heating or cooling use; these could be used to test the effectiveness of insulation measures. Likewise, many Energy Management Systems (EMSs) contain sophisticated features for analysis of building energy use that can be used to verify predicted savings.

Benefits Beyond the Meter

Measuring the financial performance of your investment in energy-efficiency technologies is important to ensure the soundness of the project. The benefits of increased comfort and improved productivity may multiply your savings even though these benefits are typically difficult to measure. The favorable comments by employees and customers can offer an indication of the magnitude of this effect.

Success Stories

Thomas Mott Bed & Breakfast is a 4,200 sq.ft. facility in Alburg, VT. President Patrick Schallert indicates that the year before the upgrade, the inn spent $9,362 on electricity; afterwards; the annual electricity bill was $1,370 - nearly an $8,000 decrease. How? The owners of the old farmhouse-turned-inn invested in wall space insulation, a state-of-the-art boiler, new windows and lights and switched the kitchen from electric to gas. They also planted trees to provide shade, which substantially lowered cooling costs in the summer. The trees also are an attractive asset.

Jose O'Shea's Café and Cantina in Lakewood, CO has installed energy-efficient lighting, an efficient HVAC system and improved insulation. The results can be seen and felt by the restaurant's customers, and the employees particularly appreciate the improved comfort and appearance. Jose O'Shea's General Manager, Jim Burns estimates energy savings of about $11,000 annually, and the 157,143 kWh saved will prevent about 195,486 pounds of carbon dioxide emissions each year.

ENERGY STAR® for Small Business

ENERGY STAR is voluntary and easy, and it will help you save money. No reporting is required. We're here to help commercial and industrial energy users apply cost-effective and proven energy-efficiency technologies. Small businesses like yours will not only save money, they will also help lay the foundation for a cleaner planet for future generations.

The family of ENERGY STAR programs, encompassing buildings, homes, office equipment, appliances, and many other areas, aims to reduce pollution and protect our environment through application of energy-efficiency technologies. Making homes, businesses, and industry more energy efficient reduces pollution because utilities don't need to generate as much electricity. That means they aren't burning as much fossil fuel, and that in turn means they aren't releasing pollutants into the atmosphere.

What Happens If You Quit the Program

The only negative impacts are that your business will continue to pay more than necessary for energy and your pollution prevention contribution will be missed. Otherwise, there are no penalties. ENERGY STAR wants to help you succeed in saving money and preventing pollution, and as long as you are willing, we will work with you to make it happen. Your business may reap the rewards of lower costs, higher productivity and sales, and improved profitability.

Pollution Prevented Through Energy Savings

For each kilowatt-hour (kWh) that you save through the application of energy-efficiency technologies, you are reducing the emissions of carbon dioxide, sulfur dioxide, and nitrogen oxides by the amounts shown in your region (see page 24). Excessive carbon dioxide emission is a primary cause of global climate change; sulfur dioxide is a key constituent of acid rain; and nitrogen oxide is responsible for smog. You will save money and help the environment at the same time, and your customers will appreciate your efforts.

Pollution prevention varies around the country because electric utilities use a variety of fuels and types of power plants to generate your electricity. In the Pacific Northwest, where hydroelectric dams are prevalent, emissions rates are comparatively low. The environmental impact can be just as high, however, because of salmon migration disruption and other issues. In other regions the mix of "clean" coal, "dirty" coal, natural gas, nuclear power, and renewable sources such as wind turbine farms affects emission rates.

An exciting prospect for the deregulated future is the marketing of "green pricing" by electric utilities. Already pilot-tested in parts of California, green pricing allows customers to specify that they want their electricity to be generated from renewable sources (solar or wind) or from particularly clean-burning power plants. In exchange the

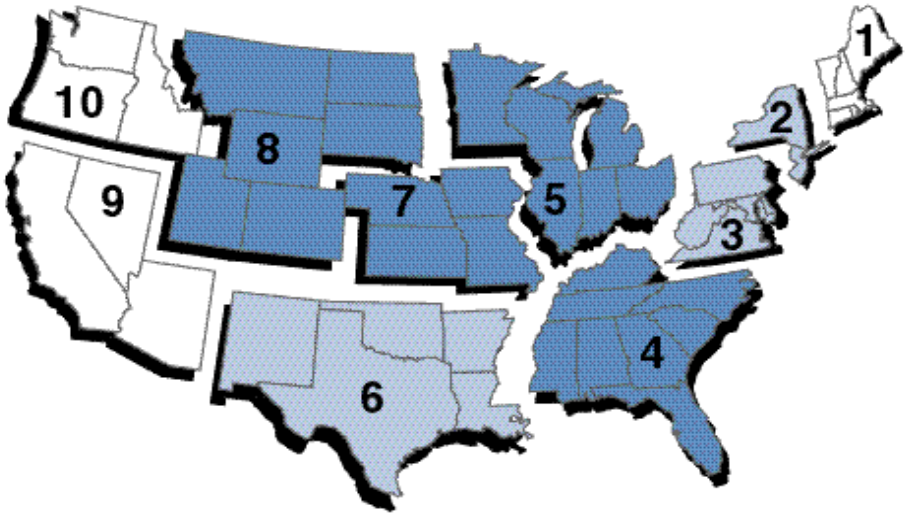
ENERGY STAR wants to help you succeed in saving money and preventing pollution, and as long as you are willing, we'll help you make it happen.

ENERGY STAR and Green Lights Program Results Through December 1998

- 19 billion pounds of pollution prevented
- $800 million in energy savings

Equivalent to

- Taking 1 million cars off the road
- Planting 2 million acres of trees



Map of pollution prevented per 1,000 kWh saved.

EPA Pollution Emission Region	Carbon Dioxide pounds/year	Sulfur Dioxide pounds/year	Nitrogen Oxide pounds/year
1	1,100	8.8	3.1
2	1,200	7.5	2.9
3	1,600	7.1	5.5
4	1,500	15.2	5.5
5	1,800	22.9	7.7
6	1,700	4.9	5.5
7	2,000	7.7	8.6
8	2,200	7.3	7.1
9	1,000	2.4	3.3
10	100	1.1	0.7

customer pays a slight premium for this higher grade of power. Look for green power in the future.

Home Offices

The growth of the Internet, telecommuting, and decentralized sales forces has triggered a huge increase in the number of home offices. If you're looking for a new home office, consider the benefits of ENERGY STAR homes. ENERGY STAR homes use 30 percent less energy than required by the national Model Energy Code and have other health and comfort advantages. See page 19 for an example of upgrades made to an existing home office. Call 1-888-STAR YES or visit the Web site at www.epa.gov/appdstar/homes/ for more information.

Final Thought

Your commitment as an ENERGY STAR partner demonstrates consideration for our shared environment and determination to address the vexing problems of global climate change, pollution, and resource depletion. We would like to thank you for doing your part to pass a healthy planet on to future generations while improving your business' bottom line.